Dr Philipson
with Dr Bennett's regards.

THE CLASSIFICATION, PATHOLOGY, & GENERAL TREATMENT OF MORBID GROWTHS.

BY

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I. Classification.

A cultivation of Histology in recent times excited a hope, that by studying the ultimate structure and mode of development of morbid growths, distinctive elements and thereby a new foundation for their classification would be discovered. But extensive researches long ago convinced me that this hope was vain; and in a special work, published in 1849,* I pointed out what were the ultimate elements of all morbid growths, and that no one of these was characteristic. In fact, the structural ultimate elements may be reduced to six, viz., 1st, molecules and granules; 2nd, nuclei; 3rd, cells; 4th, fibres; 5th, tubes (especially vascular ones); and, 6th, crystals or irregular masses of mineral matter. Now no combination of these elements will serve to characterize morbid growths, such as fibro-molecular, fibro-nucleated, fibro-cellular, fibro-vascular, &c., &c., for the simple reason that tumours very unlike in their nature and external character may be composed of the same elements. For instance, cystic, glandular, cartilaginous, and cancerous growths are all fibro-cellular. It is not, then, from the existence of one or more elementary structures, but from a careful investigation of their *mode of arrangement*, conjoined with a study

* *On Cancerous and Cancroid Growths.* Edinburgh, 1849.

of *all* the clinical facts of the individual case, that the miscroscope is destined to be of infinite importance in pathology and diagnosis. Neither will chemical composition furnish us with trustworthy means of distinguishing morbid growths, as many of them contain albuminous, fatty, pigmentary, and mineral principles, conjoined although in variable proportions.

The best classification, therefore, appears to me to be one founded on our knowledge of the compound textures of the growths themselves, assisted as far as varieties are concerned by their similitude to well-known objects or accidental circumstances, which have long been received in pathology as standards of comparison. Thus the following arrangement I think capable of embracing all the known primary classes of morbid growth :

1.	Fibrous growths	Fibroma or Inoma.*
2.	Fatty growths	Lipoma.
3.	Vascular growths	Angionoma.
4.	Cystic growths	Cystoma.
5.	Glandular growths	Adenoma.
6.	Epithelial growths	Epithelioma.
7.	Cartilaginous growths	Enchondroma.
8.	Osseous growths	Osteoma.
9.	Cancerous growths	Carcinoma.†

All these primary divisions are susceptible of being subdivided according to the presence of particular substances, or to fancied resemblances which have received names. Thus the varieties of the above kinds of growth have long been determined by their substance presenting greater or less similitude to well-known objects, such as water, lard, flesh, brain, &c., &c., as follows :

1.	Like water	Hygroma.
2.	„ black pigment	Melanoma.
3.	„ green pigment	Chloroma.
4.	„ blood	Hæmatoma.
5.	„ glue	Colloma.
6.	„ lard	Steatoma.
7.	„ gruel	Atheroma.
8.	„ honey	Meliceroma.
9.	„ cholesterine	Cholesteotoma.
10.	„ flesh	Sarcoma.
11.	„ nerve	Neuroma.
12.	„ brain	Encephaloma.
13.	„ marrow	Myeloma.
14.	„ marble	Scirrhoma, &c., &c., &c.

* The word Fibroma, though composed of Latin and Greek words, and therefore barbarous, is here given in consequence of its having been already employed in medicine. Those, however, who may object to it on this ground, can employ the more correct, though novel, term of Inoma, from *ἰς-ινος*, a fibre.

† Pus is also a morbid growth, and might be added under the name of *Pyoma;* but for the present, and in reference to what follows, it is excluded.

It is easy to understand how varieties may in this way be multiplied, and how new names may be scientifically given to rare forms of tumour: for instance, *Syphonoma*, or tubular growth, described by Henle; *Cylindroma*, by Billroth; *Heteradenoma*, by Robin; &c., &c.

Further varieties have been made to express one or more combinations of these elements, and hence the terms *Fibro-cystic*, *Fibro-cartilaginous*, *Fibro-sarcoma*, and so on. Indeed, this kind of nomenclature admits of further extension, and such terms as *Fibro-epithelial*, *Angio-cystic*, *Cystic-adenoma*, *Osteo-fibrous*, and so on, might be employed with advantage. When, also, growths have a certain resemblance to, or largely partake of, the structures and substances referred to, while their real nature is not absolutely or altogether the same, the words *Fibroid*, *Adenoid*, *Chondroid*, *Osteoid*, *Colloid*, *Hæmatoid*, *Fungoid*, *Encephaloid*, *Myeloid*, *Cancroid*, &c., have been employed.

All these words and modes of expression, as they are founded on anatomical facts, may, if carefully applied, be useful in designating the structure and nature of morbid growths. But distinctions founded on presumed vital properties are objectionable. What ideas, for instance, ought to be attached to the terms innocent and malignant? I have known the most innocent growths not operated on by the surgeon, and allowed to kill, in consequence of his believing them to be malignant, and very malignant ones not touched at that early period when their removal was likely to be beneficial, in the hope that they would go away of themselves. Distinctions sought to be established on such theoretical considerations are not only erroneous in principle, but have proved most injurious in practice.

II. Pathology.

The general pathology of morbid growths comprehends a consideration of their origin, development, propagation, and decline. It is impossible to over-estimate the importance of this subject, as a knowledge of it can alone furnish us with correct principles of treatment. Doubtless many facts are yet to be discovered as to the structure, chemical composition, and mode of formation of morbid growths; but enough has been ascertained of late years, from combined histological and chemical research, to necessitate great modifications in the views previously held regarding them. The following account is derived not only from careful study of what has been written by others, but from a large amount of original investigation.

Origin of Morbid Growths.

All morbid growths consist, 1st, in augmented development of pre-existing textures (so-called homologous or homæomorphous growths); 2nd, of new elements which have no previous existence in the economy

(so-called heterologous or heteromorphous growths); and, 3rd, of these two sorts of growth mingled together. The causes which induce them are of two kinds: 1st, local irritation excited directly or indirectly; and, 2nd, constitutional or unknown changes, supposed to operate through the blood. Thus the direct stimulus of a blow may so irritate the parenchyma of a part as to excite increased nutritive action, causing hypertrophy, or it may give rise to an exudation; and irritation at a distance may, through the nervous system, produce like effects, as when the female mamma is influenced by the state of the uterus. If, on the other hand, the constitution be affected, such local changes may assume peculiar characters. In this manner, age, sex, hereditary predisposition, and concomitant disorders, as syphilis and rheumatism, not only modify but give rise to morbid growths.

It has been a favourite idea with pathologists that morbid growths have fixed tendencies from the beginning, such as are impressed upon the ova of various animals, in virtue of which they are necessarily developed in certain directions. If so, this is not traceable to any peculiarity of structure or chemical composition. Moreover, careful observation indicates that specific differences are not impressed upon them from the first —that one does not as a matter of course exclude the other, and that any of the classes into which they have been divided may supervene upon pre-existing ones. For instance, persons may have a fibrous or glandular growth, and after a time its blood vessels may pour into it a cancerous exudation, or this latter may undergo a fibrous or fatty transformation. It is only in this manner we can explain numerous cases, which are daily observable in practice, where indolent fibrous tumours suddenly assume increased power of development and become cancers, or where these last slough out and the tissue subsequently cicatrizes.

Besides these constitutional causes, locality, that is, the nature of the pre-existing textures affected, has a considerable influence on the formation of morbid growths. Thus, as a general rule, fibrous growths are common in fibrous textures, cartilaginous and bony growths in osseous ones, epithelial growths on epidermic and mucous membranes, and so on. Yet even here, the influence of the general system is perceivable. For example, osseous growths in rheumatic constitutions occur at the extremities of long bones; but in syphilitic ones choose in preference their shafts. In youth, epithelioma occurs in the form of warts on the hands; in syphilitic people on the genitals; in chimney-sweepers on the scrotum; in smokers on the lips, &c. This conjoined influence of constitution and locality indicates the complex causes which give origin to morbid growths, and their study is of the greatest moment to the physician, who is desirous through the former of operating on the latter, as well as to the surgeon who, by removing the local disease, wishes to check the general one.

Development of Morbid Growths.

All morbid growths once formed increase according to the histological laws which regulate development in the textures generally. That is to say, after arriving at a certain point, they attract from the blood vessels in the neighbourhood, or from such new ones as are formed within themselves, the nutritive materials whereby they augment in bulk. The manner in which the textural development is accomplished is of three distinct kinds:

1. The elementary textures are produced in the same manner as they are in adult tissues. They are either more numerous or larger, but preserve their normal relation and mode of arrangement as in lipoma, adenoma, and angionoma.

2. A matter is thrown out from the blood, that serves as a blastema for the formation of cells, which may be detected in various stages of development, undergoing the same changes that similar textures are seen to present in the embryo as in fibroma and osteoma.

3. The cells whether pre-existing or newly formed, assume such a property of self-multiplication that their normal relation and mode of arrangement is at length destroyed, as in epithelioma, enchondroma, and carcinoma.

The third mode of development just alluded to deserves special consideration. It consists of the endogenous multiplication of cells, although sometimes these cells previously existed, whilst at others they have been newly formed in an exudation. To explain my meaning, I must beg the reader to consult the two figures which follow, one by Kolliker (fig. 1), representing cell structures in the softened articular cartilage of man, and the other by Redfern (fig. 2), showing similar formations in a cancerous exudation into the brain. In both a similar mode of cell development will be perceived, yet the one takes its origin from pre-existing articular cartilage cells, whilst the other arises from the new cells of an exudation, as the white substance of the brain contains no corpuscles from which they could be developed. Yet these lesions, so closely allied in their essential nature, have in these different textures been called different names, and widely separated pathologically. Nay, more, the very same changes which occur in the pre-existing cells of cartilage and of cornea also take place in those of the epithelium. But in the non-vascular cartilage and cornea such change is denominated inflammation, while in the equally non-vascular epithelium it has been named cancer. Again, in the vascular bones and glands, cells developing in an exudation have been called osteo, or medullary sarcoma; whilst in the brain or liver they have been called encephaloma. It seems to me that in all these cases the lesion is the same, and that an advanced knowledge of their nature should lead us to group them together—calling some of them

inflammation and others cancer, supposing the first to be innocent and the last malignant, must be incorrect pathology. True theory points out that all these lesions are equally destructive, in consequence of increased endogenous cell growth, and practical experience has long determined the question of their being alike difficult to control.

Fig. 1.

Fig. 1. Cartilage cells from a velvety articular cartilage of the femur of a man, *after Kolliker*, magnified 350 diameters linear—showing endogenous multiplication in pre-existing cells.

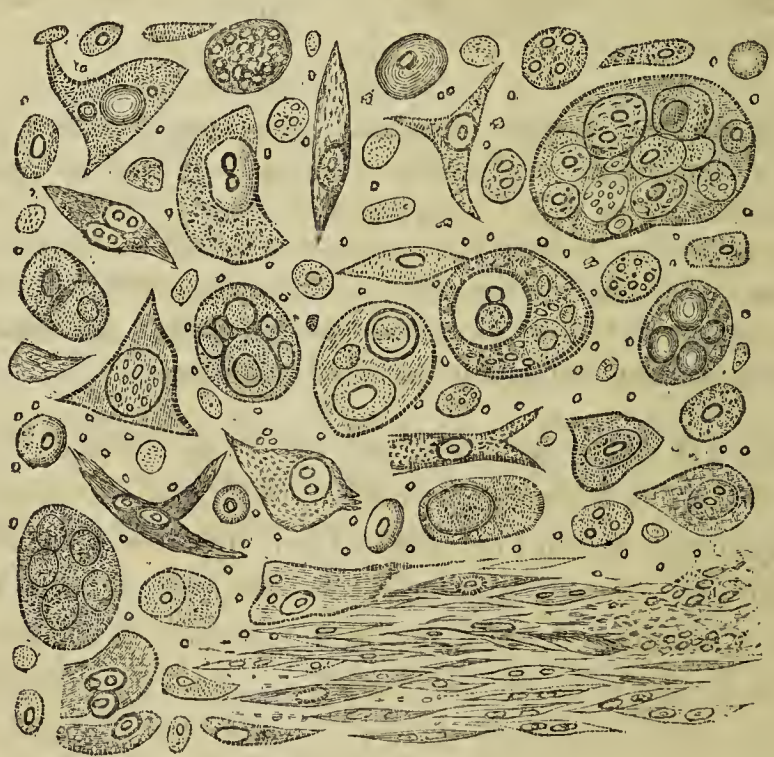

Fig. 2.

Fig. 2. Cancer cells from a cancerous growth in the brain, *after Redfern*, magnified 250 diameters linear—showing a similar endogenous multiplication in the new cells of an exudation.

As a general rule, the greater the number of cells any growth contains, the more rapidly it extends. Hence why it is subject to the laws which govern the development and multiplication of cells in addition to those connected with locality, and the general powers of the constitution. Thus, room for expansion, and the amount of temperature and moisture exercise undoubted influence over morbid growths. We see the influence of room for expansion in the cases of adenoma and carcinoma. In adenoma of the mamma the cells are confined within pouches or ducts. They become crowded on each other; and thus by means of compression tend to atrophy and breaking down, rather than to self-multiplication (fig. 3).

Fig. 3.

Fig. 3. Structure of a cystic glandular tumour of the neck, in the neighbourhood of the thyroid gland, *after Redfern*, magnified 250 diameters linear, showing the ducts distended with cells; *a*, appearance of a portion slightly separated and viewed by a simple lens, presenting a grape-like bunch of lobules; *b*, *c*, *d*, ultimate lobules, composed of single or branched cœcal tubes, distended with epithelial cells; *e*, distended condition of these on the addition of water; *f*, alteration of their shape on pressure; *g*, fusiform cells found in small numbers.

This is assisted if the distension from within so irritates the fibrous stroma of the gland that it becomes hypertrophied, and occasions a further obstacle to expansion around the seat of cell increase (fig. 4). In adenoma of the mesenteric glands, and in carcinoma, we observe that the growth takes place in extent and rapidity, proportionally to the number and power of expansion in the cells (figs. 5 and 6). If compressed by much fibrous or hard tissue they multiply slowly; but if an ulceration occurs, say in the skin, then they become developed rapidly, and constitute the so called soft fungoid excrescences. Heat and moisture, as they are essential to all growth throughout the animal and vegetable worlds (increased tem-

perature, with fluidity favouring—cold and dryness checking it within certain limits), so the influence of these physical agents may be observed to be equally powerful in morbid growths. Rapid augmentation of a tumour is generally accompanied by increased heat and softening of the parts, whilst colder and harder swellings develop themselves slowly.

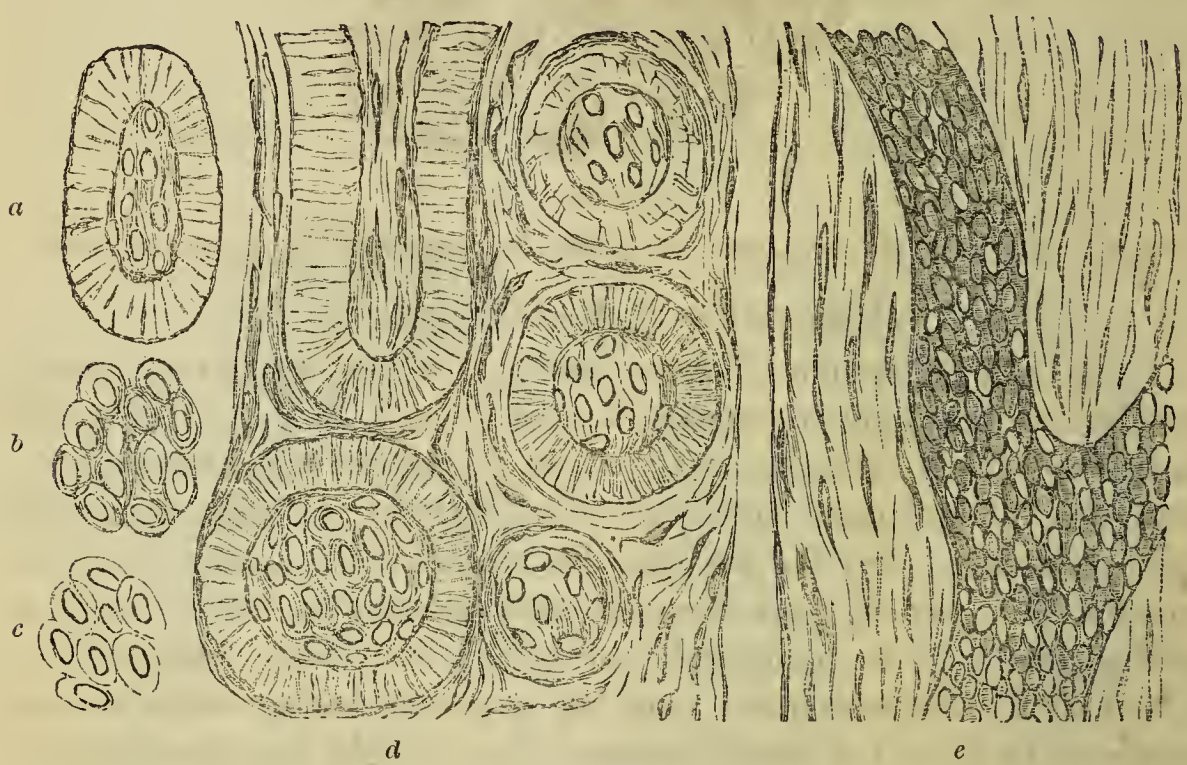

Fig 4.

Fig. 4. Structure of a glandular tumour of the female mamma, with hypertrophy of the fibrous texture magnified 250 diameters linear; *a*, mass of epithelium separated from the cut lobule; *b*, cellular contents; *c*, the same after the addition of acetic acid; *d*, their section transverse to the glandular lobules after the addition of acetic acid, showing the condensed epithelial cells; *e*, a longitudinal section, also after the addition of acetic acid, showing the hypertrophied fibrous tissue.

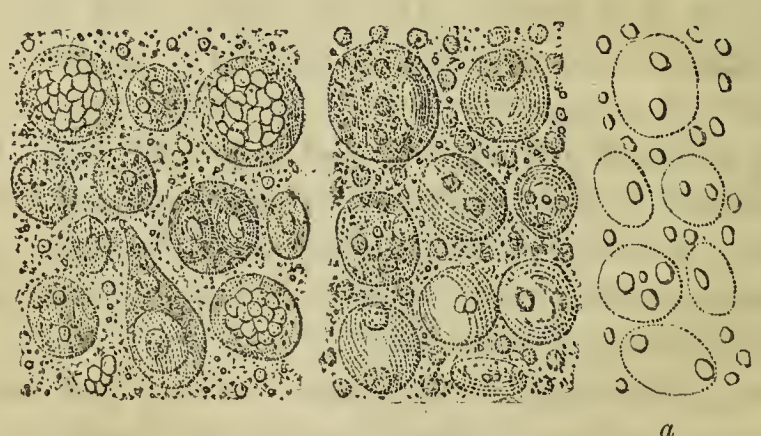

Fig. 5.

Fig. 5. Cells in the fluid squeezed from an enlarged gland in typhoid fever; *a*, after the addition of acetic acid, magnified 250 diameters linear.

Fig. 6.

Fig. 6. Cancer cells from a tumour of the toe, magnified 250 diameters linear.

Propagation of Morbid Growths.

It has been the opinion of most pathologists that while some morbid growths are local, and if removed by the surgeon, do not return, others are constitutional or general, and if cut away exhibit a great tendency to come back. The former have been called innocent or benignant, and the latter malignant. So far has this distinction in the nature of morbid growths been carried, that surgeons have refused to remove such as were supposed to be malignant, not because they were inaccessible or so connected with anatomical parts as to render the operation directly dangerous to life—but simply because they thought the disease was in the blood or neighbouring glands, and that cutting away the local swelling would either be useless, or give increased activity to the lesion.

Firmly believing that many valuable lives have been sacrificed to this erroneous principle of practice, I endeavoured to combat it in my work on cancerous and cancroid growths, published in 1849. The progress of medical science since then has fully confirmed the truth of my opinions on that subject, as cases are now on record where most kinds of morbid growths have been proved to be malignant, even in the worst sense of those who use that term. On the other hand such tumours as experienced surgeons, as well as histologists, have declared to present the typical characters of malignancy, have been repeatedly excised, without their returning, and with permanent relief to the patient. The establishment of these facts will go far to prove the unpathological character of this distinction among morbid growths, and this is easily done by reference to a few of the many recorded cases, which may now be confidently depended on as having been carefully observed.

Thus *fibroma*, consisting of absolutely nothing but fibres, in all its forms has frequently returned after operation, so that it has received the name of *recurrent* (Syme, Paget), and it has also invaded every part of the economy. The *dermoid* variety has been shown by Mr. Paget, not only to return in the mamma after excision, but to infiltrate itself in the

form of numerous distinct nodules throughout the lung.* A somewhat similar case is given by Lawrence.† Lebert‡ has recorded seven cases where *sarcoma* has spread to the neighbouring glands of the original growth and to various internal organs. Professor Smith, of Dublin,§ in a magnificently illustrated memoir, has published two cases in which *neuroma* occurred everywhere throughout the system; and Virchow has recently given a case where neuroma returned in the arm four times, and was four times excised.‖ *Lipoma* may be general in the form of excessive obesity, but even when local occasionally returns after extirpation.¶ Murchison** has given three cases where multiple fatty tumours were hereditary. *Angionoma* may be so constitutional, that cases have been published in which aneurisms were present in almost every artery of the body.†† As regards *Cystoma*, I have frequently been struck in opening dead bodies with the extensive distribution of cystic formations in some of them. In one man I found innumerable sebaceous cysts scattered over the whole anterior surface of the thorax and abdomen. Where, however, the occasional constitutional nature of *cystoma* is demonstrated, is in cases of bronchocele and mollusca. *Adenoma* is eminently constitutional, increased growths of the glandular system being common in various general disorders, as plague, syphilis, scrofula, typhoid fever, &c. Velpeau‡‡ refers to several cases where it recurred after operation in the same or opposite breast, and Aiken§§ has recorded two well-observed instances where, subsequent to the growth having recurred in the mamma, it appeared in the lungs, liver, and ovaries. *Epithelioma* not only spreads to neighbouring glands, but has also been shown by Mr. Paget to infiltrate the lungs and heart, after operations for the removal of similar growths in distant organs.‖‖ *Enchondroma* has invaded numerous dissimilar textures, and among others in the same person, the testicle and lungs.¶¶ *Osteoma*, composed of true bone (not cancer in bone, or calcareous concretions) has in a case by Mr. Swan, after affecting the femur, appeared secondarily in the pleura, lungs, omentum, and diaphragm.*** Müller††† has also referred to such constitutional osseous tumours under the name of Osteoids. Of the constitutional character of *Carcinoma* I need say nothing.

* *Surgical Pathology;* vol. ii, p. 151 et seq.
† *On Surgical Cancer;* p. 72.
‡ *Traité d'Anatomie Pathologique;* p. 194 et seq.
§ *Treatise on Neuroma.* Folio. Dublin, 1849.
‖ *Archiv für Pathol. Anat.;* band xii, p. 114.
¶ Sedillot: *Recherches sur le Cancer;* 1849. Obs. xxix.
** *Edinburgh Medical Journal;* June, 1857.
†† Cruveilhier: *Livraison* xxviii. Scarpa; fas. ix.
‡‡ *Maladies des Sein*; p. 404 et seq.
§§ *Medical Times;* April 11th, 1857; p. 359.
‖‖ *Surgical Pathology;* vol. ii, pp. 448, 449.
¶¶ Paget in *Medico-Chir. Trans.;* vol. Fichte: *Ueber das Enchondrom;* p. 58.
*** *London Pathology Trans.;* vol. vi, p. 317.
††† *Archiv für Anatomie und Physiologie.* 1843; t. v, pp. 396—442.

It follows that every kind of morbid growth may be malignant in whatever sense that term be employed, whether used to signify a growth incurable; recurring after the operation or primary lesion; attacking distant tissues and organs; or as continuing its progress and destroying life in spite of all the resources of art.

On the other hand, it is easy to prove that all these forms of growths may either disappear spontaneously, or be cured successfully by operation, so that the individual has made a permanent recovery. With regard to carcinoma, this has been denied by some and is doubted by many. On this subject I wrote in 1849, as follows, in allusion to the permanent recovery from cancer: "Doubts must always exist, regarding such cases, so long as no authentic record is preserved of the minute examination of the tumour removed. Every experienced surgeon who adopts a favourable or unfavourable view of this question, can point to crowds of cases in support of his opinion. But when he is asked whether the growth operated upon be truly cancer or not, it will be found that there are no positive grounds on which to form a conclusion. He *considered* it to be cancer, nothing more. In the present state of our knowledge, then, I believe that there is no possibility of pronouncing accurately whether an operation will be successful or not. It appears to me that all analogy opposes the doctrine of the necessarily fatal nature of cancer, or of any other morbid alteration of the economy. There was a time when phthisis pulmonalis was also thought to be necessarily fatal; and when recoveries from it led practitioners to doubt their diagnosis rather than the truth of a received dogma. Morbid anatomy has exploded that error, as it will doubtless do that in regard to cancer."*

Since then, M. Velpeau in a work published in 1854, has proved the correctness of these statements, and shown that cases which not only presented all the characters of scirrhoma and encephaloma, but which were *proved* to be so by careful histological examination, have been successfully extirpated without returning. Some of these cases are truly remarkable, the disease having arrived apparently at its last stage, and involved large masses of neighbouring glands, so that nothing could well be more desperate than operating under such circumstances. Notwithstanding, the parties have lived since the local extirpation of the disease up to this time, that is from five to eight years, in perfect health.†

If, then, there is no growth which may not be malignant, and none which may not be innocent, it follows that the distinction sought to be established between them on this basis is erroneous. The true generalization appears to be that all morbid growths may return after extirpation, may appear in different parts of the body, and under various circum-

* *Cancerous and Cancroid Growths;* p. 233.

† Velpeau: *Traité des Maladies des Sein, &c.*, 1854. I have been informed that Madam H., the case recorded in this work, pp. 686, 687, is still living, perfectly well, after six returns of the disease.

stances may prove injurious to life ; but that these tendencies are more marked in some than in others—in other words, they are dangerous in different degrees. In reference to treatment, therefore, it becomes of the greatest importance to determine the laws which govern the propagation and multiplication of morbid growths, or the circumstances which render say carcinoma and epithelioma more susceptible of being communicated to neighbouring and internal organs, than purely fibrous or osseous ones.

One circumstance of the greatest practical importance appears to have been completely overlooked by Surgeons, namely, that certain growths abounding in cells have a great disposition to infiltrate themselves among muscles and neighbouring parts, and may be detected there by the microscope, although invisible to the naked eye. In the muscles of the tongue, below an epithelial ulcer, I found numerous granules and commencing cells, though it seemed healthy (fig. 7) ; and in the sterno-

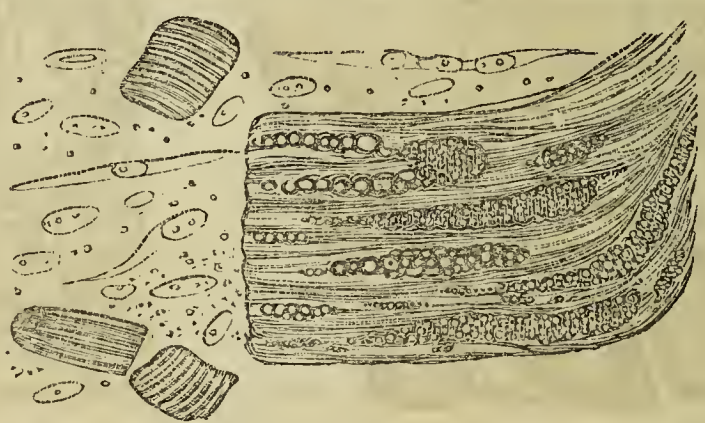

Fig. 7.*

Fig. 7. Appearance of muscular tissue a little below an epithelioma of the tongue.

mastoid muscle, covering a tumour of the parotid gland, clumps of nuclei were already developed and the fasiculi converted into fibres, although to the naked eye no trace of cancer was visible, but merely paleness and atrophy (fig. 8).

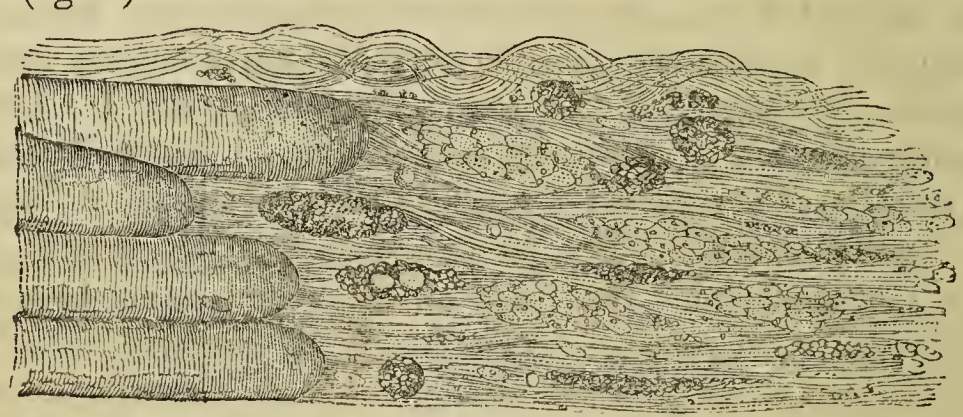

Fig. 8.

Fig. 8. Portion of the sterno-mastoid muscle over a tumour of the parotid gland.

It follows that in many cases where the surgeon thinks he has removed a morbid growth, he really leaves multitudes of germs behind, which continue to propagate. He excises the tumour, but cuts

* This and all the subsequent figs. are magnified 250 diameters linear.

through the disease. This was done in a case in which Dr. Handyside removed the inferior extremity of a boy at the hip joint, in June 1843, for cancer of the femur. I carefully examined a small portion of one of the upper flaps, which was subsequently cut away on observing a piece of the tumour attached to it, and found the muscles through which the knife had passed, fatty and infiltrated with young cancer cells (fig. 9). In short, the muscles which formed both flaps were already cancerous, and I told the operator that the disease would certainly return in the stump. The incisions healed favourably; but in a few months cancerous nodules appeared not only in the cicatrix but in other places, and caused death.* I have also seen the same mode of propagation in nerves. I

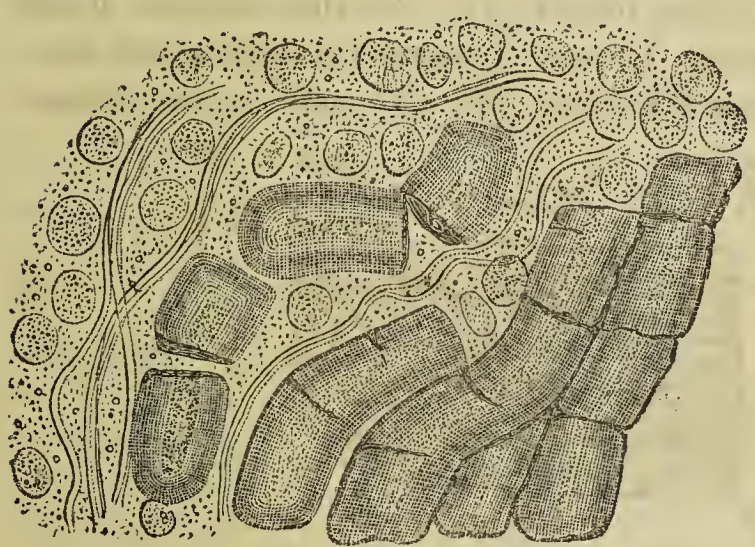

Fig. 9.

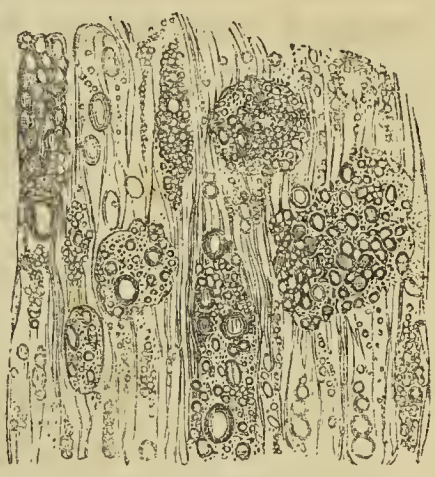

Fig. 10.

Fig. 9. Muscular tissue, slightly fatty, and infiltrated with cancer cells from the flap, after an amputation of the hip joint.

Fig. 10. Structure of the brachial nerve, leading to a tumour of the arm which was amputated.

found the brachial nerve in connexion with a cancerous tumour of the humerus, infiltrated with granular masses and granules,† some of these latter arranged in rows and meeting together, apparently to form nuclei of new cells, as in fig. 10. Professor Van der Kolk, of Utrecht, has lately confirmed these observations, and also traced incipient cancer cells among the tubes of nerves in the neighbourhood of morbid growths.‡

Hence one of the chief causes of propagation among morbid growths is, that cell germs become infiltrated among neighbouring tissues. But how is this brought about? Van der Kolk suggests that the fluid which they contain mingles with the juice of the parenchymatous substance around them, and that there are deposited in it molecules and granules, which having received from the cells or nuclei certain tendencies to evolution, are ultimately transformed into similar structures. This view is not only exceedingly ingenious, but very probable, and will serve

* *Cancerous and Cancroid Growths.* Observation xlvi, p. 103.

† *Idem.* Observation xlvii.

‡ *Nederlandsch Lancet.* September, 1853.

to explain how the blood and distant organs are secondarily affected. The notion of solid germs floating in the blood has no facts in its support, but the idea of a fluid secreted by cells being absorbed is consonant with every known law of nutrition.

The fluid then of a morbid growth, elaborated in the process of its development, and the result of cell or other formation, would seem to be the most probable material whereby secondary growths are produced. We have seen that many tumours which have no cells, may not only be recurrent, but attack tissues secondarily in distant organs. Still they all contain a parenchymatous juice; and as a general rule, those that are most soft and pulpy are most liable to return. I have recorded two remarkable examples of morbid growth, both destitute of anything like cancer cells. In one of these, the tumour was removed from the breast by Mr. Page, of Carlisle, and consisted of a pulpy fibrous substance, in various stages of development, and of granule cells. Six months afterwards, a similar growth of like structure formed in both thighs, of which she died

Fig. 11.

Fig. 11. Structure of tumour in Mr. Page's case; *a*, of a jelly-like substance; *b*, where slightly fibrous; *c*, where most dense.

(fig. 11). In the other case, the leg was amputated above the knee, by Mr. Norman, of Bath, for a fungoid tumour, below the gastrocnemii muscles. It consisted of fusiform corpuscles in different stages of de-

Fig. 12.

Fig. 12. Structure of tumour in Mr. Norman's case; *a*, before, and *b*, after the addition of acetic acid.

velopment, mingled with naked nuclei, a multitude of molecules and granules, and a few blood globules, as represented in fig. 12. Two years later a similar tumour formed in the right chest, compressing the lung, of which she died.

Such cases with those of sarcoma, neuroma, enchondroma, and epithelioma referred to, prove that a constitutional tendency to the reproduction and diffusion of morbid growths, may exist in the economy, unconnected with any particular kind of structure. But the idea that *because* they do so, they should be separated under the name of "malignant," seems to me opposed to our present knowledge of pathology, which demonstrates that all tumours may be malignant or innocent, according as they do or do not spread and prove fatal. We may just as correctly talk of a rheumatism or an inflammation being innocent or malignant, as apply those terms in different cases to fibrous, cartilaginous, osseous, or other kinds of morbid growth, for no other reason than because sometimes they are local, and at others more general.

Decline or Degeneration of Morbid Growths.

In their decline as in their development, the various kinds of morbid growths follow the laws which regulate degeneration of structure. Some, as lipoma and adenoma, have been known to be gradually absorbed and to disappear. Others undergo the albuminous, fatty, mineral, or pigmentary transformations. Thus—

Albuminous degeneration of morbid growths. This is observable in all those cases in which cicatrices are formed, and where the morbid growth becomes more dense, and ultimately converted into a dense white substance or indurated cicatrix. The former is well observed in certain so-called scirrhous growths of the pylorus or other hollow viscera, which not unfrequently consists of dense fibrous tissue, with a few nuclei, altogether destitute of cells, such as I have called *fibro-nucleated* growth, and Dr. Handfield Jones "fibroid degeneration" (fig. 13).

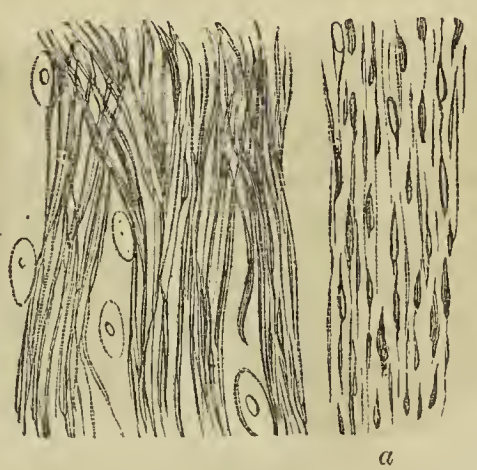

Fig. 13.

Fig. 13. Structure of a stricture of the pylorus ; *a*, after the addition of acetic acid.

The latter is frequently seen in sloughing tumours, cicatrization existing in some places, and increased cell growth in others.

Fatty degeneration of morbid growths.—This may occur in every kind of growth; the cells becoming filled with, and the fibres transformed into, oily molecules. In cancer, this degeneration is so common as to have attracted particular attention under the name of "Reticulum." It presents two forms. In one it is seen on a fresh cut surface, scattered throughout the growth to a greater or less extent, as a net-work, more thick and and abundant, however, in some places than in others. In the other it exists in masses of a bright yellow or orange colour; sometimes closely resembling tubercle, for which it has often been mistaken. In the first form, granule cells, loose oil granules more or less mingled with decayed or broken down cancer cells, are common. In the second, irregular bodies, resembling tubercle corpuscles, resulting from alteration in the form of the nucleus, after the cell wall has been broken down, are numerous. In some retrograde cancers, I have seen large portions of the growth entirely composed of such corpuscles, and not unfrequently these as well as cancer cells, in all stages of decay, are associated with crystals of cholesterine or margarine (fig. 14).

Fig. 14.

Fig. 14. Fatty degeneration of cancerous growths; *a*, with crystals of cholesterine; *b*, with crystals of margarine; *c*, liberated and fatty nuclei; *d*, the whole structure reduced to fatty molecules.

Mineral degeneration of morbid growths.—Mineral deposition may occur in all kinds of morbid growths, and is very common in fibroma and cystoma. The white fibrous tumours of the uterus may undergo true osseous transformation, but this is an occurrence of extreme rarity. Far more commonly the centres of such growths are composed of amorphous mineral depositions, which frequently increase and invade their whole substance, causing arrestation of their progress (fig. 15). In Cystoma, putty-like masses are frequently seen, or the walls of the cyst infiltrated with calcareous matter giving them solidity. In all other tumours the same fact is observable, not excepting cancerous ones. The mesenteric glands may not unfrequently be observed to be partly can-

Fig. 15.

Fig. 15. Amorphous calcareous degeneration of a fibrous tumour of the uterus —*after Wedl.*

cerous and partly cretaceous. On one occasion I examined a large cancerous growth of the omentum and peritonæum, which was so loaded with phosphatic salts, that slices of it, when dried, lost little of their bulk. The juice squeezed from this tumour, besides masses of mineral matter, was seen to contain cancer cells in various stages of disintegration, naked nuclei, fusiform cells, and a multitude of molecules, some fatty and some mineral (fig. 16 *a*). On another occasion, I found the cancer cells imbedded in, and infiltrated throughout with minute cretaceous molecules (fig. 16 *c*).

a *b* *c*

Fig. 16.

Fig. 16. Mineral degeneration of cancerous tumours; *a*, of the omentum; *b*, of the liver; *c*, of a mesenteric gland.

Pigmentary degeneration of morbid growths. Morbid growths may present a variety of colours, the principal being yellow, red, brown, green, or black. Occasionally they are white or absolutely colourless. All these various tints depend on the presence or absence of fat and blood. Bright yellow and orange textures are generally fatty; while the red, brown, green, and black are owing to transformed blood. Of the manner in which this is accomplished, organic chemistry has not yet informed us. In Melanosis there is an act of cell secretion, as the pigment is found in the interior of cells (fig. 17).

Fig. 17.

Fig. 17. Pigmentary formation in a cancerous tumour *(Melanosis).*

III. General Treatment of Morbid Growths.

We are altogether unacquainted with any kind of constitutional treatment which enables us to counteract the tendency to morbid growths, or check their progress when formed; we have therefore only to speak of a local treatment. This comprises, 1st, means of retardation and resolution; 2nd, means of extirpation.

Means of Retardation and Resolution.

These consist in putting in force all those circumstances which are opposed to the development of tissue, such as topical cold and graduated pressure, avoiding moist applications and local irritation. Such means, as they are opposed to what is known will favour cell growth in the animal and vegetable worlds, such as heat, moisture, local stimulants, and room for expansion, might be expected to retard the progress of morbid growths. Dr. James Arnott has, in consequence, found much benefit from the application of frigorific mixtures; and Dr. Neil Arnott has applied graduated pressure with occasional good effect. The difficulty of such treatment consists in the frequent impracticability of their application, as they can only be serviceable when the growth is external, and is in certain localities. Such treatment also is counteracted by the fact, that although you freeze the part externally, it is continually supplied by warm blood from within; and although you compress outside, you only thereby run the risk of causing extension towards the interior. Both these means, however, which may be carried on conjointly, are, in appropriate cases, eminently deserving further trial. As moisture favours, so dryness is opposed to cell growth; and the avoidance of local irritations, as they are a common exciting cause, is obviously indicated.

Means of Extirpation.

These are—excision of the part, and the application of chemical agents which destroy texture.

Excision. From what we have said as to the origin, mode of development, and propagation of morbid growths, it would appear that they may all destroy life, and that those which exhibit the most rapid powers of spreading may supervene on the more indolent ones. Hence, as a general rule, so soon as it becomes evident that means of retardation and resolution have failed to arrest their progress, an operation should be had recourse to. If *early* excision were more practised, many of the lamentable cases which occur in practice would not arise. Even when the disease is advanced, it should never be neglected so long as the morbid growth is external and within the reach of the knife. We have also seen that surgeons in removing tumours, have left behind tissues infiltrated with cells, or nuclei capable of causing their regeneration. Hence the neigbouring textures should be carefully scrutinized, and all those portions of them infiltrated with cancerous germs carefully removed. For this purpose the microscope ought to be a necessary instrument in the operating theatre, and every suspected tissue in the neighbourhood examined by experienced histologists, before the lips of the wound are closed. When it is known that, proper precautions being taken, an expert histologist might make such examination in the short space of thirty seconds, and that several demonstrations could be accomplished in a few minutes, or while ligatures are being placed on the vessels, it must be acknowledged that there is nothing very embarrassing in the proposition. Although I recommended this proceeding in 1849,* it has not, so far as I am aware, yet been practised by surgeons, but its propriety has been lately supported by Professor Van der Kolk, of Utrecht, and will, I believe, become the rule when a knowledge of the pathology of morbid growths is better understood. The practice of M. Girouard, of Chartres,† who by caustic directed towards the *neighbouring* tissues of cancers, has sought to destroy the germs whereby they spread, and thus to prevent the return of the growth, is, in this point of view, highly encouraging.

Chemical agents which destroy texture. The great obstacle to this practice, is the difficulty of destroying the entire growth; and if this is not always performed by excision, still less frequently is it accomplished by escharotics. Of late years an opinion has prevailed that this mode of treatment deserves further trial.‡ M. Velpeau speaks favourably of sulphuric acid mixed with saffron; and Mr. Syme has proposed sawdust as a cheaper material than saffron, whilst its action is confined superfici-

* *Cancerous and Cancroid growths;* p. 248.

† *Archiv. de Médecine;* tom. xcv, p. 789.

‡ Langston Parker, *On the Treatment of Cancerous Disease by Caustics;* 1856.

ally by a wall of gutta-percha made to adhere to the skin.* By such an escharotic the whole morbid growth, it is said, may be destroyed at once. The immediate pain is prevented by bringing the patient under the influence of chloroform, the slough is subsequently poulticed until it separates, and then the granulating surface allowed to heal. Great discussion has recently occurred as to the value of the chloride of zinc, applied by vertical scorings or slight incisions, so that it shall gradually percolate through the entire growth. This mode of proceeding takes from three to seven weeks,† but is effectual in removing the tumour, as all those who have examined the preparations in the Middlesex Hospital, and others removed by the same method of alternate incision and application of caustic by Mr. Moullin, of London, may easily satisfy themselves.‡ Other chemical agents have been proposed, but the experience acquired of these methods, and especially of their ultimate good effects, is (at all events in this country) as yet so limited as to preclude the possibility of forming a just estimate as to their merits. In the meantime let us hope that the discussion which has recently been raised on this subject may ultimately tend to improve our means of effectually eradicating the more formidable kinds of morbid growths.

* *Edinburgh Medical Journal*; November, 1857.

† *Report of the Surgical Staff of the Middlesex Hospital, &c.*; 1857.

‡ I have myself been able to do this through the kindness of Drs. Van der Byl and Handfield Jones.